Abrines, David

From: Robles, Sadira
Sent: Thursday, March 05, 2015 11:29 AM
To: Abrines, David
Cc: Everett, Adolph
Subject: FW: Rahway Arch Groundwater Impacts
Attachments: Bureau of GW Pollution Abatemt_Review.pdf

FYI

Sadira J. Robles
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From: Andrew Voros [mailto:asvoros@gmail.com]
Sent: Tuesday, February 25, 2014 9:29 AM
To: Flax, Phil; Robles, Sadira; Everett, Adolph
Subject: Rahway Arch Groundwater Impacts

Folks,

Very straight forward:

In the first page of this NJDEP Component Review of that project, it is established that:

1. the contractor never distinguished between Total Cyanide and Free Cyanide;

2. That no GW monitoring is planned; and along with the top the next page, that:

3. All "cyanide contaminated" pore water would be ejected into the groundwater, by the contractor's admission.

There are several more documents, but let's start here.

Andrew
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Andrew S. Voros
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ATTACHMENT 3
RESPONSE TO BUREAU OF GROUNDWATER POLLUTION ABATEMENT COMMENTS BY GREGORY GILES, UNDATED

The comments from the DEP reviewers are provided verbatim in italics. EastStar's responses are provided following each individual comment, indented and in normal font.

1) The 2012 ground water cyanide testing appears to have been analyzed for "total" cyanide. DEP ground water and surface water criteria are listed as "free" cyanide. As such, a proper assessment of the 2012 ground water cyanide results can not be performed. Future ground water, surface water and sediment pore. water cyanide testing should be performed using a "free" cyanide method.

Future analyses will be performed for free cyanide.

2) Section five of the RIR consists of an outline of a geotechnical study that was performed in 2012. It would be more appropriate to include this information in the RAWP where this information is lacking. Section five lists the study objectives, work locations, and methods of testing, but does not significantly present the results of the study or discuss what the results of the study "mean" with respect to the proposed remedial action.

Please refer to the response to Comment 1 to the RIR report contained in Attachment 1.

3) The PA conducted in the late 1980's reportedly stated that cyanide was detected in the Rahway River. The presence of cyanide in the Rahway River indicates the existence of a hydrologic pathway from the impoundments to the river. No surface water or sediment pore water cyanide testing data was found in the 2012 RIR. The lack of recent surface water and pore water cyanide data prohibits a determination of how much cyanide the impoundments are presently discharging to the surrounding surface waters (if any). Without recent surface water and sediment pore water cyanide data (i..e., baseline data) , how will Rahway Arch determine if their proposed remedial actions increase the discharge from the impoundments to the surrounding surface water.

The evaluation will not rely upon laboratory testing. Rather they will rely upon the fact that the reduced permeability cap will eliminate the infiltration through the alum-YPS sludge that is the primary pathway for cyanide release and will stabilize the material inside the berms, preventing any form of catastrophic release due to berm failure.

4) Sampling of the site in 2012 showed that significant concentrations of cyanide still exist in the water within the impoundments (43.2 ppm) and the underlying ground. water (12.4 ppm). Railway Arch proposes to backfill soil into the impoundments over cyanide-rich sludge (5 to 20 feet in thickness) that will be neither dewatered nor stabilized. Rahway Arch does not provide any information indicating that they have evaluated the possibility that backfilling the impoundments will drive cyanide-rich waters out of the impoundments and into the surrounding wetlands, ground water, and surface water. Other than a reference to semi-annual monitoring, Rahway Arch does not propose or provide any plan for assessing whether the actions of backfilling the impoundments is driving cyanide-rich water out of the impoundment. BGWPA is concerned that the action of backfilling and compacting soils placed in the impoundments could drive cyanide-rich water out of the impoundments and into the underlying aquifer, surrounding wetlands, and adjacent surface water.

Precipitation onto the site has been infiltrating through the sludges and into the groundwater since the construction of the berms in the 1930s. In 1989, Cytec consultants estimated more than 100 lb/day of cyanide were being released as a result of this trapped precipitation and percolation. While EastStar has calculated a slightly lower rate, percolation continues to this day at a rate of more than 75,000 gallons per day, every day, and will continue until the site is capped. The contaminated water released by the placement of the cap will be released anyway. The cap will eliminate the ongoing release of this water.

ATTACHMENT 3
RESPONSE TO BUREAU OF GROUNDWATER POLLUTION ABATEMENT COMMENTS UNDATED

Please refer to the calculations provided in Attachment 3A that demonstrate the reduction in release of cyanide contaminant during the course of the remediation and virtual elimination of release upon completion of the remediation.

4A) Has Rahway Arch evaluated the possibility that their proposed actions could drive cyanide-rich waters out of the impoundments and into the surrounding environment?

Without remediation, these *"cyanide rich"* waters will be discharged into the surrounding environment ad infinitum. The remedial action will eliminate this discharge. Please see the above response to Comment 4 and the calculations in Attachment 3A.

What actions will Rahway Arch take to assess whether the backfilling of the impoundments is, or is not, driving cyanide-rich waters out of the impoundments into the surrounding environment.

Please see the above response to Comments 4 and 4A and the calculations in Attachment 3A.

4B)What criteria will Rahway Arch use to determine if the backfilling of the impoundments is, or is not, flushing cyanide-rich water out of the impoundments.

Please see the above response to Comments 4 and 4A and the calculations in Attachment 3A.

5) In the RAWP it is stated that "Groundwater monitoring will be performed semi-annually to evaluate the ongoing groundwater conditions". No documentation is supplied in the RAW that identifies where ground water will be monitored during the remedial action. The act of backfilling the impoundments may cause fluids from the impoundments to be discharged/released in areas different from those under the present static conditions. Given that there is approximately 11,000 linear feet of exterior berm footage, has Rahway Arch evaluated whether the existing well network of 8 well locations is adequate to monitor potential impoundment discharges triggered by the proposed backfilling of the impoundments.

Section 6.3.3 of the RAW states "The 16 groundwater monitoring wells on the site will be sampled and analyzed semi-annually during the remedial action." The monitoring wells are located around the site according to a plan approved by the Department. The LSRP has reviewed the well locations based upon the historic groundwater data and does not anticipate the need for additional monitoring wells at this time. However, if groundwater gradient data from the semi-annual sampling events indicates additional monitoring locations are necessary, they will be addressed at that time.

6) A comparison of the 2012 monitor well cyanide data and the thickness of the underlying meadow mat (as seen in the BBL impoundment cross sections (RIR Appendix D)), reveals that the monitor wells showing the highest cyanide concentration are located near areas identified as having the thinnest layer of meadow mat. Has Rahway Arch taken this relationship into consideration for future ground water quality assessment and monitoring.

This possible relationship has been noted and will be reviewed during the on-going groundwater sampling and analysis. As was indicated in the above response to Comment 5, the need for additional groundwater monitoring wells will be evaluated based upon the conditions observed in the semi-annual groundwater monitoring events.

7) The berms are reported to have been constructed directly upon the existing meadow mat with wooden and earthen materials. Sludge reportedly exists below the berms in some places. On page 27 of the RIR it is stated that while the sludge initially appears firm, disturbance will cause the material to act like a highly viscous liquid. The presence of sludge under the surrounding impoundment berms may be an indicator that the contact between the

impoundment berm and the meadow mat may represent a zone of higher permeability and structural weakness with respect to berm stability. The detection of sludge outside the berms has been speculated to be from past berm failures. Given A) the lack of technical information submitted on the composition/construction of the berms, B) the significant volume of soil proposed to fill and cover the impoundments, and C) the reported detection of sludge under the berms, BGWPA is concerned that the proposed actions may lead to berm failure. What data has Rahway Arch generated that would indicate that the existing berms are capable of supporting the volume of soil.

The engineered fill cap will not rely upon the integrity of the existing berms for stability. As discussed in the RIR, the stated objectives of the geotechnical investigation included ensuring the stability of the existing berms and the material within the impoundments during and after the remedial action. The remedial design and the construction sequence discussed in the RAW comply with the geotechnical recommendations and ensure adequate factors of safety are maintained throughout.

Please refer to the response to RIR Comment 3 contained in Attachment 1 for additional details on the geotechnical investigation, design and factors of safety.

ATTACHMENT 3
RESPONSE TO BUREAU OF GROUNDWATER POLLUTION ABATEMENT COMMENTS
UNDATED

ATTACHMENT 3A

CYANIDE RELEASE CALCULATIONS

EastStar

Rahway Arch Properties LLC
Rahway Arch Site Water Model

Groundwater Discharge Analysis Results

Year of Remediation Project		1	2	3	4	5	Ongoing	Six Year Totals
Average Annual Results - 6 year Simulation								
Existing Conditions - No Remediation								
Precipitation	inches	42.8	42.8	42.8	42.8	42.8	42.8	257
	(MG)	96.1	96.1	96.1	96.1	96.1	96.1	577
Runoff	(MG)	11.6	11.6	11.6	11.6	11.6	11.6	69.5
Evapo-transpiration	(MG)	60.3	60.3	60.3	60.3	60.3	60.3	362
Percolation through Alum-YPS Sludge	(MG)	25.5	25.5	25.5	25.5	25.5	25.5	153
Release from Pore Water	(MG)							
Discharge to Groundwater	(MG)	25.5	25.5	25.5	25.5	25.5	25.5	153
	(gal/day)	69,700	69,700	69,700	69,700	69,700	69,700	
Cyanide Concentration in Impoundments	(ug/l)	4,000	4,000	4,000	4,000	4,000	4,000	
Cyanide Discharge to Groundwater	(lb/day)	2.33	2.33	2.33	2.33	2.33	2.33	
	(tons)	0.425	0.425	0.425	0.425	0.425	0.425	2.55
Conditions During and Following Site Remediation								
Precipitation	inches	42.8	42.8	42.8	42.8	42.8	42.8	257
	(MG)	96.1	96.1	96.1	96.1	96.1	96.1	481
Runoff	(MG)	11.6	39.8	56.7	65.2	68.0	68.0	241
Evapo-transpiration	(MG)	60.3	44.2	34.6	29.8	28.2	28.2	197
Percolation through Alum-YPS Sludge	(MG)	25.5	12.1	4.8	1.2	0.038	0.038	43.6
Release from Pore Water	(MG)	0.059	0.059	0.059	0.059	0.059	0.000	0.295
Discharge to Groundwater	(MG)	25.5	12.2	4.89	1.25	0.097	0.038	43.9
	(gal/day)	69,900	33,400	13,400	3,400	300	100	
Cyanide Concentration in Impoundments	(ug/l)	4,000	4,000	4,000	4,000	4,000	4,000	
Cyanide Discharge to Groundwater	(lb/day)	2.33	1.12	0.447	0.114	0.010	0.003	
	(tons)	0.426	0.204	0.082	0.021	0.002	0.001	0.734

See notes next page.

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EastStar

Rahway Arch Properties LLC
Rahway Arch Site Water Model

Groundwater Discharge Analysis Results

Notes:

1. Assumes remediation commences at the begining of Year 1 and is completed at the end of Year 5. Ongoing conditions will continue for the forseeable future following completion of remediation.
2. Preciptation, runoff, evapotranspiration and percolation calculations from RIR Appendix G - EastStar Hydrologic Budget Calculations and are based upon HELP Model analysis for the 85 acre contaminated site.
3. Release from pore water calculations based upon conditions and consolidation calculations documented in the Geotechncial Report.
4. Cyanide concentration based upon results of February 2012 samples of water trapped in the impoundments, summarized in Table 2.5 of the RIR.
5. MG = million gallons.